ARMD Technical Seminar

TUESDAY, MARCH 23, 2021
11:00–12:00 PM EDT (8:00–9:00 AM PDT)

NASA Aeronautics Contributions to the Ingenuity Mars Helicopter

Presented by:
Brian Allan, NASA Langley
Michelle Dominguez, NASA Ames
Carlos Malpica, NASA Ames
Larry Young, NASA Ames

Why attend?

Did you know that NASA's aeronautical innovators had a hand in the creation of the first flying vehicle on Mars? Here's the story of a unique collaboration between ARMD and JPL to give Ingenuity its best chance at success. NASA's with you when you fly, even on Mars!

Background

Since the late 1970s, NASA has been studying how to enable planetary flight with aerial vehicles, especially Mars airplanes. In the late 1990s, NASA began studying Mars rotorcraft and other vertical lift planetary aerial vehicles. The Ingenuity Mars Helicopter was developed by the NASA Jet Propulsion Laboratory with substantial contributions from Ames Research Center and Langley Research Center. Ames research engineers from the Aeromechanics Office performed detailed work in areas such as performance predictions, computational fluid dynamics (CFD) analysis, control law validation, and experimental analysis. Langley research engineers from the center's Aeronautics Research Directorate provided high-fidelity CFD analysis of the Ingenuity Mars Helicopter in hover and forward flight in a Martian atmosphere. This seminar will highlight these contributions and enable audience members to post their questions to be answered by the speakers. The seminar will be hosted by the NASA Aeronautics Research Institute (NARI).

The final Ingenuity. Credit: NASA/JPL

Register Now

https://nari.arc.nasa.gov/marshelicopter2021

Presenter Biography

Brian Allan is a researcher in the Flow Physics and Control Branch at NASA Langley Research Center. Dr. Allan received his Ph.D. in 1996 from the University of California at Berkeley. After graduation, Dr. Allan joined ICASE in Hampton, VA as a research scientist working in the area of active flow control. In 2003, Dr. Allan joined the Flow Physics and Control Branch at NASA Langley and performed research on high-fidelity CFD for the design of active flow control for a boundary layer ingestion inlet, and active flow control for rotorcraft fuselage drag reduction. Currently, he is the Technical Lead for High Fidelity Modeling within the Revolutionary Vertical Lift Technology (RVLT) project and is working on high-fidelity CFD analysis of the Lift+Cruise NASA VTOL Urban Air Mobility (UAM) concept vehicle.

Presenter Biography

Michelle Dominguez plans to graduate with a B.S. in Mechanical Engineering from San Jose State University in 2021. As a NASA Pathways intern, Ms. Dominguez has contributed to numerous aeromechanics projects such as the evaluation of Black Hawk helicopter airloads results, which enabled critical benchmark data to be available to the public. Ms. Dominguez supported extensive testing at Ames in the Mars Aeolian Laboratory for the first wind tunnel evaluations of a helicopter rotor under Martian atmospheric conditions. Most recently, Ms. Dominguez was awarded the 2020 Women of Color Student Leadership Undergraduate Level Award and the 2020 Ames Student Honor Award.

Presenter Biography

Carlos Malpica graduated from the University of Maryland in 2008 with a Ph.D. in Aerospace Engineering, and then moved to California to join the Ames Aeromechanics Office. At Ames, Dr. Malpica worked on flight controls and handling qualities of advanced rotorcraft configurations. Currently, he is the Technical Lead for Flight Dynamics and Control within the Revolutionary Vertical Lift Technology (RVLT) project and is focused on handling and ride qualities research aimed at passenger acceptance of urban air mobility concepts. Dr. Malpica was a key member of the Ingenuity development team for flight control system engineering development, modeling, and testing.

Presenter Biography

Larry Young received his B.S. and M.S. in Mechanical Engineering from Washington State University and now works in the Ames Aeromechanics Office. Mr. Young performs research on advanced aerial vehicle and aerospace system conceptual design. Among his current and past projects are studies into fundamental vortical flow physics, planetary aerial vehicles, rotary-wing vehicles for disaster relief and emergency response missions, and advanced tilt-rotor aircraft design. Mr. Young was an early researcher into Mars rotorcraft and other vertical takeoff vehicles for planetary exploration